

**Abstract**

The invention relates to a cell growth and/or differentiation regulatory peptide comprising a sequence of about 9 to about 150 amino acids derived from acetylcholinesterase amino acid sequence, preferably from the C-terminal region of acetylcholinesterase. The invention also relates to pharmaceutical compositions comprising the peptides, particularly for use in promoting survival of stem cells, promoting differentiation of stem cells, promoting growth of stem cells and/or promoting the growth-enhancing effect of a growth factor on stem cells, alone, or in combination with other growth factors. Of particular interest is the use of the peptides in the treatment of thrombocytopenia, post-irradiation conditions, post-chemotherapy conditions, or conditions following massive blood loss and promotion of neural progenitors in use for cell therapies aimed at restoring neural functions in diseased individuals. Further, the invention relates to antibodies against the peptides, inter alia for diagnostic use, for example, the diagnosis of stress-induced male infertility. The invention also relates to *in vitro* and *in vivo* methods for screening of drugs that affect the central nervous system, and are potential modulators of interactions between the “readthrough” form of acetylcholinesterase, AChE-R, the intracellular receptor RACK1 and the kinase PKC.